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IS 13885 (2001): Non-Magnetics/Char in Sponge Iron (DRI) - Methods of Determination [MTD 30: Sponge Iron and Smelting Reduction]

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(पहला पुनरीक्षण)

Indian Standard

NON-MAGNETIC/CHAR IN SPONGE IRON (DRI) — METHODS OF DETERMINATION

(First Revision)

ICS 75.160.10 ; 77.080.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 2001 **Price Group 1**

Sponge Iron and Smelting Reduction Sectional Committee, MTD 30

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Sponge Iron and Smelting Reduction Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was earlier published in 1993. This revision has been taken up incorporating the experiences gained during the period.

In rotary kilns based Direct Reduction Processes, non-magnetics/char is generated during the production of sponge iron and even with the best type of magnetic separators. It is virtually impossible to separate out 100 percent of the same from the magnetic sponge iron. Non-magnetic/char which is extraneous gangue, is an undesirable part of the sponge iron and hence should be limited to within reasonable limits.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical value (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 JULY 2010
TO
IS 13885 : 2001 NON-MAGNETIC/CHAR IN SPONGE IRON (DRI) — METHODS OF DETERMINATION

(First Revision)

(*Page* 1, *clause* **1**) — Substitute the following for the existing:

'This standard prescribes methods for determination of non-magnetics/char in truck load of sponge iron, in sponge iron stack and sponge iron packed in bags.'

(*Page* 1, *clause* **4.2.1**, *line* 1) — Substitute 'per' *for* 'par'.

(*Page* 1, *clause* **4.2.2**, *line* 3) — Substitute '20 kg' *for* '10 kg'.

(*Page* 1, *clause* **5.1**, *line* 1) — Substitute '1 250 mm' *for* '750 mm'.

(*Page* 2, *clause* **5.2.1**) — Add the following at the end of the last sentence:

'kept in contact with the materials. The typical intensity of the hand magnet should be 950 to 1 000 gauss.'

(*Page* 2, *clause* **5.3**) — Add the following new clause after the **5.3**:

'6 DETERMINATION OF PERCENTAGE OF NON-MAGNETICS IN SPONGE IRON PACKED IN BAGS FROM TRUCK/WAGON/ STACK

6.1 Sampling — Sponge iron packed in bags, a sample shall be collected by random selection of bags. The minimum number of bags and increment shall be as per the table given below:

Bag lot in Nos.	*No. of bags sampled on random basis*	*No. of increments from each bag*	*Minimum mass of each increment*
Up to 200	20	2	1 kg
200-1 000	40	2	1 kg
1 000-5 000	60	2	1 kg
5 000-10 000	80	2	1 kg
10 000-25 000	100	2	1 kg
25 000-0 000	120	2	1 kg

6.2 Test Procedure

6.2.1 If the sample quantity is more than 20 kg, weight Sample reduction shall be made by coning and quartering method and if not, the entire quantity of sample shall be separated by hand magnet. The separation process will be repeated until all magnetics are collected by magnet kept in contact with the materials. The typical intensity of the hand magnet should be 950 to 1 000 gauss.

6.2.2 The sample so collected in sample container as per 6.2.1 shall be weighed and mass noted, say (Z).

6.2.3 The non-magnetics, thus left after magnetic separation shall be weighed and mass noted, say (Y).

6.3 Calculation

$$\text{Percentage of non-magnetics from sample} = \frac{Y}{Z} \times 100\text{'}$$

7 DETERMINATION OF PERCENTAGE OF NON-MAGNETICS IN SPONGE IRON FROM MOVING CONVEYORS

7.1 Sampling

25 kg sample of sponge iron lumps/fines shall be collected using standard shovels at the discharge end of the moving conveyors in two or three increments.

7.2 Test Procedure

Same as per **6.2**.

7.3 Calculation

Same as per **6.3**.

(MTD 30)

Reprography Unit, BIS, New Delhi, India

Indian Standard

NON-MAGNETIC/CHAR IN SPONGE IRON (DRI) — METHOD OF DETERMINATION

(First Revision)

1 SCOPE

This standard prescribes methods for determination of non-magnetics/char in truck load of sponge iron and in sponge iron stack.

2 REFERENCE

The following standard contains provisions which through reference in this text, constitutes provision of this standard. At the time of publication, the edition was valid. All standards are subject to revision , and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
1405 : 1982	Methods of sampling of iron ores (*second revision*)

3 EQUIPMENTS

3.1 Weighing Device — capacity of 50 kg.

3.2 Sampling Scoop — capacity of 8 kg.

3.3 Hand Magnet — size 100 × 150 mm with handle and detachable plate.

3.4 Sample Container

4 DETERMINATION OF PERCENTAGE OF NON-MAGNETICS IN TRUCK LOAD OF SPONGE IRON

4.1 Sampling

4.1.1 Before unloading the sponge iron from the truck, a sample shall be collected by random sampling according to IS 1405. The minimum quantity of sample shall not be less than 20 kg out of 10 tons of material.

4.1.2 In case the sponge iron to be unloaded by magnet the following steps shall be taken:

a) Since the magnet may not lift all the materials, the material left at corner of truck shall be collected and magnetically separated by hand magnet.

b) The non-magnetics left after removal of sponge iron shall be collected in sample containers.

4.2 Test Procedure

4.2.1 The sample collected as par random sampling method from the truck shall be weighed and the mass noted, say (Z).

4.2.2 In case the quantity is more than 20 kg the quantity reductions shall be made by coning and quartering to 10 kg and if not entire quantity shall be separated by magnets.

4.2.3 Non-magnetics are separated by using hand magnets and the separation is repeated till all magnetics are collected by magnet. The mass of the total non-magnetics weighed shall be noted, say (Y).

4.2.4 The non-magnetics collected from the bottom of the truck after removal of sponge iron shall be weighed and mass noted, say (Y_1).

4.2.5 The total tonnage of truck load of sponge iron shall be taken and mass noted, say (Z_1).

4.3 Calculation

Percentage of non-magnetics from the sample $= \frac{Y}{Z} \times 100$ ...(1)

Percentage of non-magnetics left over $= \frac{Y_1}{Z_1} \times 100$ ...(2)

Total percentage of non-magnetics, 1 + 2 $= \left(\frac{Y}{Z} + \frac{Y_1}{Z_1}\right) \times 100$

5 DETERMINATION OF PERCENTAGE OF NON-MAGNETICS IN SPONGE IRON STACK

5.1 Sampling

The sponge iron shall be stacked to a height of 750 mm and upto 25 tons in each lot. Five holes exposing the bottom of the stack shall be made in the stack. A minimum of 2 scoops of sample shall be collected from each hole combining the material from bottom to top. Random samples also shall be collected from sides of the stack. The sample thus collected shall be combined and a gross sample prepared.

5.2 Test Procedure

5.2.1 If the sample quantity is more than 20 kg. Weight reduction shall be made by coning and quartering principle and if not the entire quantity of sample shall be separated by hand magnet. The separation process is repeated until all magnetics are collected by magnet or on magnetic separator.

5.2.2 The sample so collected in sample container as per **5.2.1** shall be weighed and mass noted, say (Z).

5.2.3 The non-magnetics thus left after magnetic separation shall be weighed and mass noted, say (Y).

5.3 Calculation

$$\text{Percentage of non-magnetics from the sample} = \frac{Y}{Z} \times 100$$

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Sponge Iron & Smelting Reduction Sectional Committee, MTD 30

Organization	*Representative(s)*
Tata Iron & Steel Co Ltd, Jamshedpur	Dr Amit Chatterjee (***Chairman***)
Central Fuel Research Institute, Dhanbad	Representative
Essar Steels, Mumbai	Shri K. Jyothi
Gas Authority of India, New Delhi	Shri R. G. Rajan Shri P. S. Sareen (*Alternate*)
GSAL Ltd, Hyderabad	Shri K. P. Patnaik Shri K. S. N. Murthy (*Alternate*)
HEG Ltd, Durg	Shri S. N. Mishra
Ispat Industries Ltd (Nippo Denro), Raigad	Shri V. V. Jamnis Shri A. K. Saxena (*Alternate*)
Jindal Steel & Power Ltd, Raigarh	Shri K. C. Thatoi Shri U. Bhattachrjee (*Alternate*)
Kudremukh Iron Ore Co Ltd, Chikmaglur	Shri T. R. R. Rao
MECON (India) Ltd, Ranchi	Shri P. Bhattacharya Shri A. K. Agrawal (*Alternate*)
Ministry of Steel, New Delhi	Shri D. Kashiva Shri S. K. Bhatnagar (*Alternate*)
M. N. Dastur & Co (P) Ltd, Kolkata	Adhip Sengupta Ms Aditi Tarafdar (*Alternate*)
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Mukand Ltd, Thane	Shri C. H. Sharma
National Metallurgical Laboratory, Jamshedpur	Dr Swatantra Prakash
National Mineral Development Corporation Ltd, Hyderabad	Representative Shri A. Chatterjee (*Alternate*)
Nova Iron & Steel Co Ltd, Bilaspur	Shri A. Rajasekaran Shri B. Gopichand (*Alternate*)
Orissa Sponge Iron Ltd, Distt Keonjhar	Shri N. K. Patnaik Shri S. C. Jena (*Alternate*)
Prakash Industries, New Delhi	Representative
Raipur Alloys, Raipur	Shri N. Rath
SAIL, R&D Centre, Ranchi	Shri G. I. S. Chauhan Dr K. K. Prasad (*Alternate*)
Sponge Iron Manufacturers' Association, New Delhi	Shri S. S. Bhatnagar
Sponge Iron India Ltd, Khammam	Shri M. Amareshwar Rao
Steel Furnace Association of India, New Delhi	Shri M. S. Unninair
Sunflag India Ltd, Bhandara	Shri D. K. Gaur Shri S. P. Dash (*Alternate*)
TATA Sponge Iron, Distt Keonjhor	Shri B. M. Sarangi
Usha (India) Ltd, New Delhi	Shri B. K. Roy
Vikram Ispat, Mumbai	Dr S. K. S.Yadav
BIS Directorate General	Shri N. Mitra Director & Head (MTD) [Representing Director General (*Ex-officio*)]

Member-Secretary
Shri Ram Awadh Ram
Deputy Director (MTD), BIS

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